DOCUMENT RESUME

ED 297 543 EC 210 394

AUTHOR Schell, Robert E.; And Others
TITLE Development of Language Behavior in an Autistic Child.
PUB DATE Feb 67
NOTE 16p.; For related document, see EC 210 395.
PUB TYPE Reports - Descriptive (141) -- Journal Articles (080)
JOURNAL CIT Journal of Speech and Hearing Disorders; v32 n1 Feb 1967

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Autism; *Behavior Change; *Behavior Modification; Case Studies; Expressive Language; *Interpersonal Competence; *Intervention; *Language Acquisition; Receptive Language; Social Development; Young Children

ABSTRACT

The monograph describes a systematic attempt to develop language behavior in a nonverbal autistic 4.5-year-old boy who was essentially unresponsive to environmental stimuli of any kind. The 45-session intervention focused on teaching him to attend, increasing his responsiveness to people, effecting discriminative responses to a variety of controlled auditory and visual stimuli, increasing the extent and rate of his vocal and nonvocal behavior, and increasing the control of his behavior by verbal commands. Principles of behavior modification were used in such activities as "tickling," various games in which the child's verbalizations maintain the action, and responding to his name and simple commands. The intervention resulted in an increase in the frequency and variety of his verbal and nonverbal behavior; his behavior is more under appropriate stimulus control; and people are more frequently sources of discriminative and reinforcing stimuli for him. He laughs, makes some sounds similar to those of others, responds to his name, pays attention, does simple tasks, and is generally more alert and responsive. (DB)

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DEVELOPMENT OF LANGUAGE BEHAVIOR IN AN AUTISTIC CHILD

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Reprinted from the *Journal of Speech and Hearing Disorders*
February 1967, Vol. 32, No. 1

EC 210 394

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Therapeutic failure with nonverbal autistic children is well known. Positive results have occurred only now and then. For any particular case the outcome of therapy is always uncertain, and progress, when it occurs, is irregular and slow. The frustration of the speech clinicians and clinical psychologists who have tried to help such children has often resulted in complete pessimism.

This situation is probably due as much to a lack of available information on workable techniques and principles as to anything else. The current literature offers very little in the way of

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February 1967, Vol. 32, No. 1

usable behavioral techniques or methods, their assessment, or their principles of application with nonverbal disturbed children. Much of the recent literature on the use of learning principles can be found in sections of the two volumes edited by Ullmann and Krasner (1965). In addition, there are two pertinent articles (Hewett, 1965; Lovaas et al., 1966) reporting systematic and direct manipulation of behavior.

Following is a report of our own efforts to develope language in a young autistic boy. Our work has also been marked by an attempt at systematic analysis, evaluation, and modification of his behavior. Operant conditioning procedures have been, in a sense, our main "treatment" variable, while changes in the form and frequency of his verbal and nonverbal behavior have been our dependent variables. Some of our techniques are very much like those used in the papers just mentioned, but others are new. We think that, in conjunction with other reported techniques, they are potentially useful to clinicians. We are reporting our procedures in some detail because in applying principles of learning to a particular case it is helpful to know of many various methods that have been used with other cases.

INITIAL EVALUATION AND DESCRIPTION

Kipper D. was four and a half years old when we first saw him. He had not developed speech and was generally unresponsive to environmental stimuli. During previous examinations he had been variously diagnosed as deaf, mentally retarded, autistic, and aphasic. When he was three years old, he was enrolled in a preschool class for deaf children. He made no progress and was subsequently referred for speech therapy to a speech and hearing clinic. Speech therapy was attempted for six months and then discontinued as Kipper again failed to show any improvement.

The most recent assessment at the Institute for Childhood Aphasia did not result in any clear interpretation of Kipper's disorder. He was called an "enigma"—no firm conclusions were drawn with respect to neurological or intellectual status. All that was certain was that Kipper's primary difficulties were consistent with a picture of autism.

When we first saw Kipper, his parents' presenting complaints were that "he can't pay attention," has "no speech," shows "inconsistent hearing" and "other unusual behavior." In particular, his unusual behavior consisted of periods of "finger flicking" (strumming the index or small fingers of his left hand with the index finger or four fingers of his right hand), and periods of sitting very still and "staring off at something."

He was essentially unresponsive and inactive during our initial evaluation. He sat where placed without moving. He showed no response to his name. When eye contact could be achieved, his face remained expressionless ("mask-like"), giving the impression of a "blank stare." He was heard to utter only a few random sounds. When tickled he made only a slight flinching movement. As far as could be determined, he showed no response to auditory stimuli or social reinforcers.

DEVELOPING SPEECH: ANALYSIS AND POINT OF VIEW

While our ultimate objective is to develop verbal and nonverbal communication, we have proceeded in a very gradual fashion with Kipper. Our efforts have been based on the assumption that children first learn to speak by imitation. Provided the child can hear sounds, has the functional vocal equipment necessary to produce sounds, and receives reinforcement for producing sounds, he should be able to learn to imitate speech sounds produced by others.

But there appear to be prerequisites to each of these requirements. Apart from hearing sounds, most children look at or attend to the source of speech sound—the mouth and associated regions of the speaker's face. Looking at or attending to people in this and other connections usually has a long history of reinforcement. Acquisition and maintenance of attending behavior is considered necessary, then, for subsequent establishment of progressively finer discriminations of visual and associated auditory stimuli. Besides having the required functional vocal apparatus, most children have also made extensive use of it in producing sounds of different forms and magnitudes. They have cried, whimpered, babbled, giggled, shouted, and so on. Self-generated sound production is familiar to them, occurs frequently, and has had many effects on their environment. Sound production has been followed by positive reinforcement; most children have received conditioned positive reinforcers such as a smile, a pat, laugh, hug, or an exclamation of "Fine!", "That's it!", "Good boy!", or "Hooray!"

In Kipper's case there was no evidence of reliable vocal or nonvocal response to any form of auditory stimuli; his base rate of response to auditory stimuli was essentially zero. Attending behavior to people was generally nonexistent. Similarly, the emission rate of vocal sounds of any form was essentially zero; although, he was capable of making some sounds. Finally, we quickly discovered that the most powerful reinforcer for Kipper was food or candy. The usual social stimuli were inoperative.

Our program was designed to increase 1) attending behavior to human face, mouth, and speech stimuli, 2) the rate of emission of vocal and nonvocal responses in several forms, 3) the positive reinforcement value of people, and 4) the rate of discriminative nonvocal and vocal responses to auditory and associated visual stimuli. We have tried to increase the variety and frequency of Kipper's behavior, bring it under appropriate stimulus control, and establish people as sources of both discriminative and reinforcing stimuli.

TREATMENT

After our initial evaluation, Kipper was scheduled three times per week for 75 minutes a session. At the present time he has had 45 sessions. The first few sessions were designed to reduce any emotional behavior elicited by unfamiliar situations and people, and to begin establishing Kipper's clinicians as sources of positive reinforcement. The clinicians, one male (J.S.) and one

female (J.G.), sat quietly with Kipper in the clinic waiting room for the first few minutes of these sessions. When he relaxed, made a sound, or looked at one of them, that person smiled, said something to him, and simultaneously cuddled or patted him while placing a piece of candy in his hand or mouth. During the rest of these first sessions the same sequence was followed, but in the setting of four interconnected rooms which were used in all subsequent training sessions. When it appeared Kipper was becoming fairly well adapted and was associating the clinicians with positive reinforcement, a number of specific tasks were introduced. These tasks are presented under four sections. Eventually, part of every session was devoted to several of the tasks.

Sorting Task We started with a visual sorting task since it was our impression that Kipper was most likely to attend to and respond discriminatively to visual cues. In addition, a sorting task seemed a good choice since the visual stimuli can be presented quickly and easily, kept simple or made complex, and the response can be relatively simple, requiring little effort.

A sorting box which could be divided into 1 to 6 compartments was constructed. A stimulus could be readily attached on top of the back wall of any compartment. The sorting box was placed on a child's table in a room with one-way vision. Kipper and the clinician sat across from one another, about 2 feet apart.

Kipper first learned to put a blue block in a single compartment with an identical blue block attached to it. Initially, he was only required to sit in his chair and then look at the block, held by the clinician. A trial consisted of the clinician's raising the block to a point near her chin and holding it there until Kipper had looked at it for a count of three. (The count was silent.) A successful performance was followed by a piece of candy, a smile from the clinician, and, frequently, a comment like "Good boy!" Only five trials like this were run since he looked at the block for the count of three on all five trials.

Next Kipper was started on the sorting sequence. The clinician taught him by moving his hands and arms through the required sorting sequence. First he was required to reach for and grasp the block. This capitalized on the tendency to look where you reach. In addition, by holding the block next to her chin the clinician increased the frequency of his looking at her face and mouth. After he looked at and grasped the block, a passive Kipper was led through the sequence of bringing the block toward himself, looking at it for a moment at eye level, then looking away and at the blue block stimulus on the compartment, looking back at the block in his hand, and then reaching toward the compartment again and placing his block in it. After placing his block in the compartment he was given a piece of candy, a smile, and praise. Kipper was led through six of these demonstration trials. More were not necessary as he rapidly and correctly placed the block on 10 subsequent trials without aid.

Next he was given a color discrimination problem. The sorting box was divided into two compartments with a blue block attached to one compartment and a yellow block of the same size to the other. One demonstration

trial was given for each of the two blocks; Kipper being led through the sorting sequence as before, ending with the block being placed in its appropriate compartment and the presentation of candy, smile, and praise. If Kipper made an incorrect placement on subsequent trials, he was allowed to correct it and still receive reinforcement, although it was recorded as an error (i.e., incorrect response). The blue and yellow blocks were presented to Kipper in random order and after he made eight successive correct responses, the sample stimuli were also alternated in a random fashion to preclude successful performance on the basis of position. In this and all subsequent tasks the adopted learning criterion was 10 successive correct responses. Kipper reached criterion on this simple color discrimination problem in 14 trials.

Immediately following this task he was given the further color discrimination tasks of sorting two chips (blue and yellow) and then two patches of color (blue and yellow) swabbed on white 3″ × 5″ index cards. For these tasks Kipper was given only a visual demonstration of the required sorting performance. He reached criterion on both tasks in the first 10 trials.

These discrimination tasks were learned in the first 75-minute session. In the following 25 sessions he learned fairly rapidly all the visual discrimination problems presented. Using stimuli reproduced on blank white cards, we have presented many different visual discrimination problems. Kipper learned to do color discrimination problems with three or four stimuli in an average of four trials. Discrimination problems involving several similar forms or shapes (e.g., circles or squares) were learned on the average in six trials. After learning in nine trials to discriminate different letters (such as O, K, and S) presented two or three at a time, he learned to discriminate similar letters (t, f, and k) in two trials.

Pictures of familiar objects were also used in discrimination problems. Kipper first learned to match three, four, or five different pictures of objects such as a shoe or a chair. On these tasks he took 12 trials on the average. He next learned to sort pictures which were similar, but not identical, to the pictures attached to the compartments. For example, the sorting box might be divided into three compartments and a picture of a shoe attached to one compartment, a chair to another, and a pair of trousers to the other. Kipper was then given pictures of shoes, chairs, and trousers, that were to some degree different from those pictured on the cards attached to the compartments. He learned these kinds of discriminations on the average in three trials. As a final step in this series of picture problems, Kipper was required to put pictures of five pieces of furniture into one compartment and pictures of five items of clothing into the other compartment. A sixth item of furniture or a sixth item of clothing served as the stimulus on one of the two compartments. He learned this particular task in about 40 trials. While this might seem as if Kipper had actually learned the concepts of "furniture" versus "clothing," this was not the case. Rather, he had learned the particular compartment stimulus for each item. He failed to sort correctly when presented a new set of furniture and clothing items.

There is, of course, the further question of how well Kipper retains what

he has learned. We have tested this by readministering almost all the sorting tasks. Each task was given again for 20 trials, and the number of errors recorded. Some tasks have been given again once, others several times. The time between initial learning and retesting has ranged from 1 to 37 days. Kipper has never had more than five incorrect responses out of the 20 new trials on any task at any time, and usually he has scored 95-100% correct.

We see all of Kipper's training and retesting as essential prerequisites to the establishing of auditory discrimination. Since initially he showed no detectable response to auditory stimuli, it was considered necessary to get him to attend more frequently and to respond more discriminatively to stimuli that did show at least weak control over his behavior—namely, visual stimuli. At the same time, this approach offered the chance to increase the reinforcement value of people.

Kipper is now proceeding through a training sequence involving sorting of the letters O and M. These were selected because Kipper now makes [ɑ] and [m] sounds fairly frequently, and because distinctly different facial patterns are used to produce the two sounds. The letters are reproduced on cards so as to resemble the shape of the mouth when it forms the sounds [ɑ] and [m]; the O is somewhat oval shaped and the M looks like an exaggerated pair of closed lips. They match the color of the clinician's lipstick. Each letter has also been reproduced in three forms: with heavy, medium, and barely visible lines. Each time a letter is presented, the clinician holds the card below her mouth and makes the sound. The sound commences with initial presentation of the card and continues until Kipper has made the sort. The aim is eventually to drop out the heavy lined letters, then the medium, and then the barely visible ones. By fading the visual stimulus, the auditory one is made primary. If this works, Kipper should arrive at the point of sorting correctly blank cards with only the [ɑ] and [m] sounds as discriminative stimuli. It will then be possible to move on to further variations, such as having him hand the clinician an O or M letter from a pile of various letters when she makes the sound of [ɑ] or [m]. The crucial test will come, of course, when the clinician or someone else makes the sound with his back turned or with his face shielded from Kipper.

AUDITORY DISCRIMINATION TASK

About three weeks after Kipper had started the visual discrimination sorting tasks, an auditory discrimination task was introduced for part of each session. The apparatus consists of a panel from which two levers protrude. On the end of each lever is a soft rubber ball, a red ball on one lever, a blue ball on the other. The panel stands on top of a table so that Kipper can readily reach either ball while sitting in a chair. The levers move only when pushed forward. First Kipper was shown how to push the levers and given ten practice pushes of the blue ball lever with continuous reinforcement of candy.

He was then required to learn to push the blue ball within two seconds after presentation of a discriminative stimulus (i.e., a stimulus which marks the occasion when a response will be reinforced). A piece of candy was given after each correct response. The time between response and presentation of

the discriminative stimulus was varied from 2 to 15 seconds. Kipper was considered to have learned a particular discrimination when he made 10 successive correct responses.

In order to guarantee Kipper's succeeding at a strictly auditory discrimination task, we proceeded in the following fashion. We began with a visual discrimination, moved next to an auditory-visual discrimination, and then began auditory discriminations proper. He first learned to push the lever when a light mounted above the panel went off for two seconds. He next learned to push the lever when a loud "click" sound (55-70 dB) from a speaker in back of the panel was paired with the light dimming noticeably for two seconds. In the next step, the light dimming stimulus was discontinued and Kipper had to respond only to the auditory click stimulus. Once this discrimination was established, we then paired —as the discriminative stimulus—the click sound with the spoken word, "push." As a final step in the sequence, the click sound was discontinued and Kipper was required to respond to the single discriminative auditory stimulus, "push."

Kipper's progress on these tasks is illustrated by the summary data presented in Table 1. He needed fewer trials to learn each succeeding discrimination. Later performance, at various times after initial learning, also shows high retention on each discrimination. In addition, he performs equally well on retesting whether he has had 60 additional trials or as few as 10.

With these encouraging results at hand, a next step is to get Kipper to respond to the red ball lever upon presentation of a spoken word stimulus distinctly different from the "push" used with the blue ball lever. When this is accomplished, it may then be possible to introduce further verbal variations such as, "Push red," or, "Push the blue ball." This lever pushing task may also turn out to be a good way of permitting the presentation of the verbal instruction, "don't," such as, "Don't push red," versus, "Push red."

In reporting Kipper's progress on both the sorting and the auditory discrimination problems, we have omitted mention of several important observations. First, we found more than once that if Kipper made errors on a problem it was due to the fact that he had not been attending when the item or stimulus was presented. This was likely

TABLE 1. Stimulus discrimination in lever push task.

Discrimination Condition	*Trials to Criterion*	*Number of Trials Given After Reaching Criterion Point*	*Later Performance (Days Later)*		
			1-6	*7-12*	*26-30*
Light	114	60	90*	—	85
Light & Click	52	30	100	90	—
Click	45	20	95	—	90
"Push" & Click	22	20	80	90	—
"Push"	19	10	80	80	85

*Entry is the percentage of correct responses on 20 trials. No entry indicates retest not given at this time.

to occur when he was still chewing a piece of candy. The solution was simple: wait until he finished eating. We also found that if Kipper was failing to learn a discrimination, it might be because the discriminative stimuli involved were not distinctive enough for him. In these instances we found it expedient to maximize their distinctiveness by exaggerating such attributes as size or intensity. After a few trials the exaggerated attribute could be returned to its regular value. There were also times when his failure seemed to be a consequence of too long a delay before presentation of reinforcement. As far as possible, therefore, long delays were avoided. Finally, we also learned to avoid giving any subtle cues such as the clinician's moving her hand in connection with a correct response or in connection with the presentation of a stimulus. We found Kipper would readily rely on this kind of unintended stimulus as a cue for successful discrimination. Such observations impressed upon us the need to be continually alert for variations in the operant conditions in even the simplest situations.

Prompting and Shaping of Verbal Behavior Shortly after Kipper started on the auditory discrimination task, we also began working to increase the frequency and range of his speech sounds. Since he was initially nonverbal and essentially unresponsive, we worked first on bringing about relatively gross and then finer imitative behavior under specific conditions. Later on, more stress has been placed upon increasing speech sounds emitted during less controlled conditions. In every instance the attempt has been to make what happens much like a game. Aversive conditions are avoided, or, if unavoidable, the activity is terminated until the aversive conditions are removed. In addition, positive reinforcers such as candy, praise, smiles, hugs, cuddling have been used continually.

Kipper first learned to stand up by imitating the clinician. Next he was required to look at the clinician's face before he stood up and as he arose. He successfully learned to do each of these in one session.

For the next imitative sequence Kipper and the clinician sat facing each other but about one-and-a-half feet apart. Kipper was required to open his mouth in the shape of an "O" in imitation of the clinician. For the first five trials the clinician prompted him to open his mouth by holding his chin and cheek and gently pulling to force the mouth open. Over the next nine trials she faded from just touching the chin and cheek, to just touching the chin, to just a slight movement toward the chin. From the 15th trial on, Kipper opened his mouth in imitation without further prompting.

Since Kipper occasionally made subglottal and aspirate sounds when he opened his mouth, we next worked to get him to make a sound more like the vowel sound [ɑ]. This required a great deal of prompting. As he imitatively opened his mouth, the clinician pushed his abdomen to force a vocalization. At the same time, the clinician made the sound [ɑ]. As soon as Kipper uttered any sound, she again produced [ɑ] and said, "Yes, good boy!" while giving him a piece of candy.

That these quasi-shaping efforts did have some effect on Kipper's [ɑ] production is illustrated by the rough data presented in Figure 1. The relative proportion of [ɑ] sounds produced by Kip-

per is shown for four different sessions. Included as [ɑ] sounds were [ɑ], [a], [ɒ] and [ʌ]. The baseline session shows there were essentially no responses by Kipper similar to [ɑ] before prompting and reinforcement of such sounds was

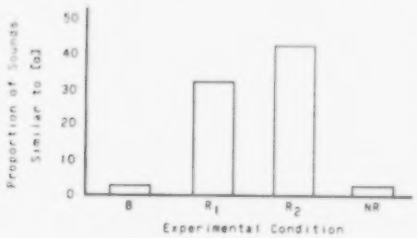

Figure 1. Proportion of utterances similar to [ɑ] under different experimental conditions. B indicates baseline; R_1 and R_2 are the 1st and 2nd reinforcement sessions; NR indicates nonreinforcement of [ɑ] sounds.

started. Sessions R_1 and R_2 are the first and second sessions after termination of prompting sounds by gently pushing on Kipper's abdomen. In these sessions the clinician continued to reinforce sounds by immediately saying, "[ɑ], Yes, good boy!" and giving Kipper a piece of candy. If Kipper responded only by opening his mouth, the clinician made no sound or comment and gave no candy. As illustrated in Figure 1, reinforcement during these two sessions maintained the relative proportion of [ɑ] sounds produced by Kipper. That this was due to reinforcement also being contingent on [ɑ] sounds is illustrated by the decrease in the relative proportion of such sounds during the NR session. In this session, the clinician reinforced all sounds except those similar to [ɑ] and the relative proportion of [ɑ] sounds dropped nearly to zero.

At this point we decided to forego further training with Kipper under these particular conditions. While the [ɑ] sounds he made could be categorized easily, they were not strongly voiced sounds, did not seem natural for him, and showed little indication of becoming any more frequent. In addition, the frequency and range of sounds that he produced under these specific conditions, as well as at other times, continued to be very limited. We attempted to provide a number of different conditions that would prompt more frequent speech sounds and ones of greater variety and magnitude. At the same time, an effort was made to arrange conditions so that the sounds uttered by Kipper would have observable and reinforcing effects principally mediated by people.

One general approach has been to give positive reinforcement whenever possible for any vocal sounds emitted by Kipper. This has meant reinforcing any sounds he emits while he is in the clinic waiting room, while going to or coming from the therapy rooms, as well as while working on a task. On any occasion, the appropriate reinforcement may consist of hugs, cuddling, holding his hand, candy, praise, or "echoing" the sound he has made in the form of a suitable word or question. An attempt is also made to remove aversive conditions when a sound occurs in their presence.

An illustration of this approach is provided by the following exchange which occurred naturally during a recent sorting task. The clinician gave Kipper a nonpreferred piece of candied cereal instead of candy. Kipper emitted a nasal [ʔʌ] sound and threw it down, and as he did so the clinician quickly made it into a game. She questioningly

said, "No, no?" while shaking her head. She then began saying, "Candy, yes!" while smiling and nodding her head accordingly. Kipper continued to watch her every expression and move. As he watched, she held the cereal in one hand and the candy in the other. She then quickly opened one hand or the other, having Kipper look, and saying for the open hand with the cereal, "No, no!" and with the candy, "Candy, yes!" while also making appropriate head gestures and facial expressions. As she was making her final "Candy, yes!" comment, the clinician placed the cereal back in its dispenser while giving Kipper the candy. Upon receipt of the candy, he again made a sound. The clinician continued to give Kipper a nonpreferred cereal on the remaining trials of this 20-trial session. By the 7th trial he was no longer throwing the cereal but handing it back to her. As he did this, she would ask, "What do you want?", wait until he made a sound, and then say, "Candy, yes!" while giving him a piece. This gamelike procedure was effective in altering the sounds Kipper made. By the 12th trial he was vocalizing a [nənə] sound when presented with the cereal. And, on five of the last six trials in this session, he responded with the sound [kɪkɪ] when asked, "What do you want?"

Deliberately arranging play activities is another approach that has been effective in increasing Kipper's vocal behavior. At first these activities consisted mostly of "tickling" play. The clinicians prompted laughs, giggles, and smiles by tickling him. At the same time they would laugh, giggle, and smile themselves. These activities evolved into gamelike episodes with Kipper giggling and smiling while moving around out of reach of the clinicians, and then letting himself, with peals of laughter and giggling at each point, be caught, tickled, held, and cuddled. After about five such sessions, prompting of Kipper's laughter by tickling was no longer necessary. The clinicians' gesturing towards him with their hands and arms while smiling and laughing would get him to smile, giggle, and to approach them.

These early activities have been followed by a number of other play activities. The intent has been to get Kipper to make a sound that fits the activity. Some examples follow. The clinician lies on the floor with his knees up, Kipper is held in sitting position on the clinician's knees, and when he makes a sound that resembles the word "down," the clinician says "down," releases Kipper, and lets him slide down the clinician's legs. In the "up" game, the clinician stands holding Kipper under the arms, and when Kipper makes a sound like "up," the clinician says "up" while lifting Kipper up in the air. A horseback game is similar to the preceding examples. The clinician gets down on the floor on his hands and knees with Kipper on his back, and when Kipper makes a sound similar to "go," the clinician says, "Go!", moves a little way, and then stops. Kipper can keep the clinician moving by continuing to vocalize "go" sounds at the rate of about one every three seconds. More recently, toys have also been used. The clinician rolls a car containing a piece of candy to Kipper, or lets a ball drop and roll through a long clear plastic tube when Kipper makes the required sounds.

In each of these activities we are

arranging things so that Kipper's vocal behavior produces positively reinforcing consequences. The effectiveness of the approach is illustrated by data collected in the horseback game and summarized in Figure 2. The [g] sound was a good one to use in this game since it was a natural one for Kipper and emitted fairly frequently. The actual sounds recorded, and judged to be similar to "go," consisted of [gɑ], [go], [gou], [gʌ] and [gɛ]. Before we instituted the reinforcement conditions of the game (baseline), about one out of every five sounds made by Kipper was a "go" sound. During each of the five sessions in which reinforcement was in effect, however, there was a significant ($p < 0.05$) increase in the proportion of "go" sounds compared to both the baseline and nonreinforcement sessions. In

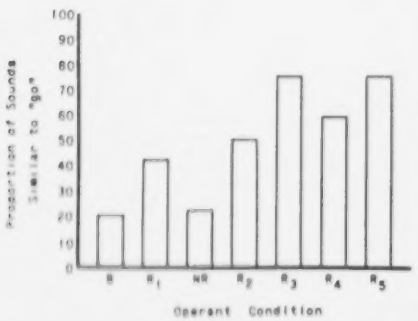

Figure 2. Proportion of sounds similar to "go" under operant conditions of horseback play. B indicates baseline; NR indicates nonreinforcement session; R_1, R_2, R_3, etc., indicate 1st, 2nd, 3rd, etc., reinforcement sessions.

the nonreinforcement session the clinician reinforced all sounds except those similar to "go," and the proportion of "go" sounds during this session dropped to a level comparable to that of the baseline session.

The next step in each game is to help Kipper bring the sounds he makes into progressively closer approximation to the clinician's example. If he can be brought to the point of reliably making a distinct sound in each game, it may then be possible to bring about a limited form of response transfer. His saying of "go" or "up," for example, can be made functionally relevant to a number of situations. Conditions could be so arranged that Kipper's saying "go" would have the effect of bringing about going to the bathroom, going up the stairs, or going to get a drink of water. A further step might be to add a word or two to the one-word verbal response established in each context and use, "Go stairs" or "Now go stairs."

Increase in Nonverbal Behavior and Its Verbal Control by Others

Besides trying to increase Kipper's sound production and its effects on his environment, we have attempted to bring some of his nonverbal behavior under verbal control. This was not possible before he became active and more responsive. While we cannot provide definitive data, it appears that the tickling and game activities were more instrumental than anything else in stimulating Kipper's initial responsiveness and activity. It was our impression that when these activities began, Kipper moved around more in the various rooms with less hesitation. He began to open and shut doors, to look into cupboards, closets, and empty rooms, to run from one room to another by himself instead of being led by the hand, and so on. These were all very desirable forms of "self-assertive" behavior from our point of view, and we made every effort to reinforce them with praise and attention. We also noticed that as Kip-

per began to engage in "appropriate" activities, his finger-flicking became less frequent. Although finger-flicking still occurs when he is very excited, we expect that it will eventually disappear altogether.

Once Kipper began to be more active and responsive, it became possible to introduce verbal commands. Before giving a command, the clinicians made certain that Kipper was looking at them. Almost invariably they found that if he was not looking before and at the time a command was given, he failed to respond. Presumably, this was primarily due to vocal speech stimuli being so much less meaningful for Kipper than other forms of auditory stimuli or visual stimuli. All the commands have only required already established behavior. In some instances Kipper's initial skill was crude and he was given active instruction and practice. When necessary, visual cues were supplied by pointing or gesturing. These additional cues, however, were eliminated as soon as possible.

The first attempt to get Kipper under a verbal control took place when he would get up from his chair between trials on a task and wander around the room. Since he did not respond to his name being called, the sound of a tap on the chair was also used. Kipper would turn toward this sound and when he did the clinician called his name again and gestured for him to come. After he came back, the clinician smiled, cuddled him, told him, "That's a good boy!" and gave him a piece of candy. Eventually the tap sound was dropped altogether. He will now usually respond in other situations as well as the original training one to just the "Kipper, come" command, without having to see the clinician speaking.

Some other commands that have been introduced as verbal controls are the following: "Shut the door," "Open the door," "Turn off the light," "Turn on the light," "Get your chair," "Push it," "Get the candy," and "Let's get water." Up to a point each of these commands now evokes the appropriate behavior from Kipper. On occasion additional cues still have to be provided by accompanying gestures, pointing, or demonstration. Perhaps the most important qualification is that each of these verbal commands is most likely to be effective when given under conditions resembling those of the initial learning situation. The effectiveness of a command is still rather situationally tied. Thus, for example, it would be more correct to say that when Kipper is told to "Turn off the light," he will reliably do so under the right set of conditions.

A number of professional personnel has had the opportunity to observe Kipper. Some saw him only once after four months had passed, while others saw him for several sessions during this period. Their consensus is, "He looks more like a normal boy." They note that in the sessions he now more frequently laughs and smiles appropriately, makes other sounds and noises, responds to his name, responds to gestures and comments, pays attention to people and things around him, asserts himself, and successfully does simple tasks.

From Kipper's parents' reports, it appears that a few of the things he has learned in the context of the sessions now occur at home as well. For exam-

ple, shortly after Kipper had begun to master the steps involved in getting a drink of water by himself from a kitchen in the clinic, he began one day doing the same thing at home. His parents have also reported at various times that he more frequently looks at them, runs, climbs, opens things, looks into things, hands things to them, responds to his name, makes sounds, and otherwise is more alert and responsive. These changes probably reflect the effect of favorable conditions both at home and in the clinic. Others have observed that occasionally Kipper will now look at, approach, smile, or sit next to people in the clinic waiting room. This suggests that people other than his clinicians are also more likely to be sources of discriminative and positively reinforcing stimuli.

Finally, we would like to stress that what has been presented is an account of our attempts at systematic translation and application of tested behavior principles; in no way is it offered as the best, exact, or final way of bringing about verbal and nonverbal communication with any particular mute, disturbed child—whatever his "label" may be. On the one hand, attention can be drawn to the similarity of some of our views and efforts in working with Kipper and those reported by Lovaas et al. (1966) in their work on speech development in mute schizophrenic children. But it is particularly striking to us that those children are inpatients and receive treatment 6 days a week, 7 hours a day—with a 15-minute rest period each hour. It may well turn out that such an extensive and intensive involvement in the life of a profoundly disturbed child is required throughout or during certain periods of treatment or, at least, that it is more necessary than many professional people currently believe.

SUMMARY

This report deals with a systematic attempt to develop language behavior in a nonverbal autistic boy who was essentially unresponsive to environmental stimuli of any kind. We found that this involved teaching him to attend, increasing his responsiveness to people, effecting discriminative responses to a variety of controlled auditory and visual stimuli, increasing the extent and rate of his vocal and nonvocal behavior, and increasing the control of his behavior by verbal commands.

We devised a number of tasks and activities to prompt, develop, and maintain these new behaviors. Our treatment efforts were based upon behavior modification principles. We present their actual application in some detail, since there is still little information available on procedures that are appropriate and likely to work with nonverbal disturbed children.

Results are presented showing the relative effectiveness of our treatment methods to date, and these are described and discussed. We note that the boy has shown marked improvement in comparison to the initial picture he presented. In technical terms, there has been an increase in the frequency and

variety of his verbal and nonverbal behavior, his behavior is more under appropriate stimulus control, and people are more frequently sources of discriminative and reinforcing stimuli for him. Stated in less precise terms, he is hardly the "vegetable" he was at first. He responds more frequently and appropriately to events and people around him. He laughs and giggles, makes some sounds similar to those made by others, responds to his name, pays attention, asserts himself, successfully does simple tasks, and is otherwise more alert and responsive.

ACKNOWLEDGMENT

This study was supported in part by funds from the California Scottish Rite Foundation and the Chronic and Sensory Diseases Branch of the Public Health Service. The authors wish to acknowledge the generosity and support of Jon Eisenson, Professor of Speech Pathology and Audiology, and Director, Institute for Childhood Aphasia, and the sponsorship of R. E. Schell, during 1965-66 a NICHHD Special Fellow, by Karl Pribram, Professor of Psychiatry and Psychology, School of Medicine, Stanford University. Special thanks are due Carol Kersch for recording the behavior data.

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